
# Serbian Ceramic Society Conference
# ADVANCED CERAMICS AND APPLICATION IV
## New Frontiers in Multifunctional Material Science and Processing

Serbian Ceramic Society
Institute for Testing of Materials
Institute of Chemistry Technology and Metallurgy
Institute for Technology of Nuclear and Other Raw Mineral Materials
School of Electrical Engineering and Computer Science of Applied Studies

## PROGRAM AND THE BOOK OF ABSTRACTS

Serbian Academy of Sciences and Arts, Knez Mihailova 35
Serbia, Belgrade, 21-23. September 2015

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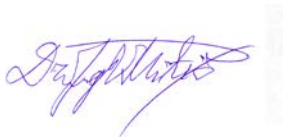
Dear Colleagues, Dear Friends,

We have great pleasure to welcome you to the Advanced Ceramic and Application Conference IV organized by the Serbian Ceramic Society in cooperation with the Institute for Testing of Materials, Institute of Chemistry Technology and Metallurgy, Institute for Technology of Nuclear and Other Raw Mineral Materials, Institute for Technical Sciences SASA and School of Electrical Engineering and Computer Science of Applied Studies.

Advanced Ceramics play an important role in the European Union's prioritized materials to enable the transition towards to a knowledge-based efficient societies. The chosen Conference topics cover fundamental theoretical research in advanced ceramics, modeling and simulation of technological processes, controlled synthesis of nanomaterials, developing of new composite and hybrid structures which should provide practical realization of the new ideas and brings new quality in everyday life. ACA IV Conference gathers the researchers, engineers, academy staff, artist, specialist and PhD students trying to emphasizes the key innovation activities toward developing the next generation of advanced ceramics products for industry of high-technology, renewable energy sources, environmental efficiency, security, space technology, cultural heritage, prosthesis, etc.

Serbian Ceramic Society has been initiated in 1995/1996 and fully registered in 1997 as Yugoslav Ceramic Society, being strongly supported by American Ceramic Society. Since 2009, it has continued as Serbian Ceramic Society in accordance to the Serbian law procedure. Serbian Ceramic Society is almost the only one Ceramic Society in the South-East Europe, with members from more than 20 Institutes and Universities, active in 16 sessions, by program and the frames which are defined by the American Ceramic Society activities.



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*World Academy Ceramics Member*
*European Academy of Sciences&Arts Member*

Prof. Dr Olivera Milošević,
*President of the General Assembly of the Serbian Ceramic Society*
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**General Conference Topics**

- Basic Ceramics Science
- Nanostructural, Bio- and Opto-Ceramic Materials and Technologies
- Multifunctional Materials
- Magnetic and Amorphous Materials
- Construction Materials and Eco-ceramics
- Composite Materials, Catalysis and Electrocatalysis
- Artistic Ceramics and Design, Archaeology and Heritage
- Young Researchers
- Sintering processes
  -kinetics
  -microstructure
  -thermodinamics
  -modeling

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# Synthesis of novel multiferroic $Fe_3O_4$-nanocellulose-PVDF-$BaTiO_3$ nanocomposites

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It is well known that the properties of polymer/ceramic nanocomposites depend not only on the properties of their individual components but also on morphological and interfacial characteristics arising from the combination of used materials. The use of nanocellulose in synthesis of various nanocomposites, gain great relevance not only due to its renewable nature and biodegradability, but also due to its unique structure and tendency to form intra- and intermolecular bonding. Our research focus on the use of nanocellulose (NC) functionalized with $Fe_3O_4$ for the production of novel multiferroic $Fe_3O_4$-NC-PVDF-$BaTiO_3$ nanocomposites. Functionalized nanocellulose was prepared by co-precipitating Fe(II) and Fe(III) ions in aqueous solution containing NC with ammonia. NC\$Fe_3O_4$ with different content of NC were sonicated in DMF and subsequently added to PVDF/$BaTiO_3$ mixture, resulting in multi-component mixtures with four different concentrations of NC. XRD and Raman analysis were used to study the phase composition of nanocomposites, while their morphologies were examined by SEM and AFM. It has been shown that the addition of nanocellulose had a positive effect on PVDF $\beta$-phase formation, which is responsible for its ferroelectric properties. As a result, the formation of composite multi-component hybrid material with multiferroic properties is enabled.